

Effects of Weight Cue Reactivity on Self-Report Measures of Body Dissatisfaction

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ABSTRACT

This study is an investigation on the effects of weight cue reactivity on measures of body dissatisfaction in a sample of college-aged students. Self-report questionnaires of psychological constructs or ratings are administered to large samples of participants in experimental and correlational studies due to their efficiency and relative ease of use. However, research has shown that answers can be influenced by the participant's awareness of certain information or external forces, a phenomenon known as "reactivity." Currently, empirical literature has not identified the influences of weight cue information on self-report body dissatisfaction measures. 77 Participants ($M_{\text{age}} = 20.22$, 50.6% female) completed measures rating body dissatisfaction and were randomly assigned to experimental conditions of specific weight cues (i.e., being weighed) given before self-report measures; general weight cues (knowledge of impending weight measurement afterward) given before self-report measures; and no weight cues given before self-report measures. It was hypothesized that groups that received weight cues would report greater body dissatisfaction on self-report questionnaires than groups which received no cues, after controlling for BMI. There were significant differences between conditions, as those in the specific and general weight cue conditions were significantly more dissatisfied with their body shape than

those in the control condition, and there were no significant differences between genders. These data appear to provide evidence suggesting that weight cue reactivity follows the same conditions as other, more extensively researched, cue-based reactivity

INTRODUCTION

Self-report questionnaires of psychological constructs or ratings are administered to large samples of participants in experimental and correlational studies due to their efficiency and relative ease of administration (Gorber, Tremblay, Moher, & Gorber, 2006). However, research has shown that a participant's answers on self-report measures can be influenced or altered by the participant's awareness of certain information or external forces (Simpson, Kivlahan, Bush, & McFall, 2005), a phenomenon known as "reactivity." Reactivity effects are similar to those elicited by demand characteristics, in which the participant's awareness of being observed may significantly influence his or her responses (Orne, 2009). The Hawthorne effect is an example of a type of reactivity, in which the participant's awareness of being observed causes the participant to amend his or her behavior. Such an effect can be damaging to a study's internal validity, as changes in the participant's behavior or responses may be due to factors other than changes in the independent variable (Heppner, Wampold, & Kivlighan, 2008).

Reactivity effects can be particularly detrimental to research regarding body dissatisfaction. Body dissatisfaction (BD) is defined as the degree of negative feelings associated with body shape, weight, or body image (Cash, Fleming, Alindogan, Steadman, & Whitehead, 2002). Body dissatisfaction research primarily focuses on the correlations between self-image and the attitudes or behaviors of those who may or may not be satisfied with elements of their body (Furnham, Badmin, & Sneade, 2002). However, the literature does not currently address the issue of reactivity on body dissatisfaction research, specifically regarding the degree to which these effects alter the validity of self-report questionnaires. The focus of this study is to observe and document the influences of reactivity effects on self-report measures of body dissatisfaction.

Cue-Based Reactivity

A reactivity effect that occurs directly in response to particular stimuli is referred to as cue-based reactivity (Carter & Tiffany, 1999). This effect, which is most commonly observed in drug-use behavior and addiction (Tetley, Brunstrom, & Griffiths, 2009), as well as eating behaviors/disorders (Jansen, 1997; Carter, Bulik, Lawson, Sullivan, & Wilson, 1995), has been extensively researched. For example, the presence of drugs, such as a cigarette for someone with a nicotine addiction, or various types of foodstuff, such as various high-calorie treats for someone who has an eating disorder, can elicit significant physiological changes and subjective responses on self-report measures that differ from when a neutral stimuli is presented (Tetley et al., 2009; Jansen, 1997; Carter et al., 1995). However, relatively little is known about weight cue reactivity; the effects of exposing

information on physiological measures of height, weight, or body mass index (BMI) during a weight-related study. There is a dearth of empirical data that has examined the influences of providing or withholding information of personal weight measurements (weight cue reactivity) when a participant is told to self-report their own perceptions of body image or, specifically, body dissatisfaction.

Relation to Other Research

Weight cue reactivity has a variety of implications for body image and obesity research. Studies have suggested that the extent of body image satisfaction or dissatisfaction can be altered within particular circumstances and is subject to fluctuation (Melnik, Cash, & Janda, 2004), particularly among those concerned with their appearance or weight (Tiggermann, 2001). Similarly, certain contextual elements, such as the nature of the body image task, could potentially confound how an individual self-reports body image and could subsequently elicit greater body dissatisfaction due to the altered internalized perception or representation of the person's body (Waller & Barnes, 2002).

In obesity research, there have been variations in regards to procedures involving height and weight. Participants are often measured either before or after completing self-report questionnaires, and are sometimes even asked to self-report their own height and weight prior to filling out these questionnaires (see Waller et al., 2002; Larsen, Ouwers, Engels, Eisinga, Strien, 2008; Cash & Hicks, 1990 for examples). This method of reporting height and weight could potentially cue feelings of body dissatisfaction, particularly among those participants who are overweight or obese. Evidence of effects from cued

attitudes of media-portrayed thinness on women (Stice & Shaw, 1994) would help support this conclusion. Nevertheless, no studies were identified that have experimentally examined the magnitude of effects of weight cue reactivity on self-report measures of body dissatisfaction.

Purpose of the Study

The current study is an investigation on the effects of reactivity by providing or withholding weight cues on self-report measures, specifically between male and female college-aged students. The study will take an experimental approach on addressing the issue of reactivity, and it will be the first study to directly examine reactivity on body dissatisfaction. Participants will be given a battery of questionnaires to measure anxiety, stress, mood states, depressive symptoms, and eating attitudes, along with measures designed to assess body dissatisfaction. The participant will have height and weight measurements taken at some point during the study. The independent variable will be defined objectively by assigning participants to groups in which they will (a) receive no weight cues, (b) receive specific weight cues (i.e., being weighed) before completing self-report measures, or (c) receive general weight cues (knowledge of impending weight measurement after filling out questionnaires) before completing self-report measures. The dependent variable of interest is the level of perceived body dissatisfaction. It is hypothesized that groups that receive weight cues will report greater body dissatisfaction on self-report measures than groups that received no cues, after controlling for body mass index (BMI).

METHOD

Participants

Participants were recruited through the University of Kansas research participation system and were awarded credit towards the fulfillment of a research requirement component of their introductory course. 150 individuals indicated interest with 51.3% participating. 77 subjects (50.6% female, mean age = 20.22, SD = 3.43) participated in this study. The sample in this study was drawn from a pool of undergraduate students enrolled in an introductory psychology course. All participants consented to the study and participated fully. No follow-up was necessary with the participants due to the nature of the study. No participants were excluded in the analysis at the conclusion of the study.

Materials and Procedure

Participants were given a packet of questionnaires and self-report measures to analyze stress, anxiety, mood, eating attitudes, and body dissatisfaction.

Mood states. Mood states were measured using the Profile of Mood States (POMS; McNair, Lorr, & Droppleman, 1991), which was developed for use with individuals 18 years of age and older and has been well validated since its release in 1971. The brief form version was used, which consists of 30 items assessing affective mood states, such as tension, anxiety, depression, and anger. Participants respond to each item using a five-point scale (0=Not at all accurate, 4=Extremely accurate). Related items were compiled into six subscales (tension, depression, hostility, fatigue, vigor, and confusion), which were all summed (with the exception of vigor, which was subtracted) to give a total mood disturbance (TMD) score. Higher scores on TMD indicated greater negative mood disturbance (McNair, Lorr, & Droppleman, 1991). The measure has been shown to have internal consistency

of subscales ranging from .63 to .96 depending on scale (McNair, Lorr, & Droppleman, 1991). In the present study, subscale reliability scores ranged from .57 (confusion) to .89 (vigor).

Anxiety was assessed using the State Trait Anxiety Inventory (STAI – form Y-1; Spielberger, 1983) which consists of 20 items that assess the intensity of anxiety experienced by the participant at that moment by rating themselves on the following 4-point scale: (1) Not at all, (2) Somewhat, (3) Moderately so, (4) Very much so. The scores on this measure range from 20-80, with higher scores indicating greater feelings of anxiety. Internal consistency (α) for this measure has been reported as 0.77 (Spielberger, 1983), with this study recording $\alpha = 0.90$.

Depressive feelings were assessed using the Beck Depression Inventory II (BDI-II; Beck, Steer, & Brown, 1996) a measure composed of 21 items drawn from the depression criteria of the DSM-IV designed to assess the intensity of depression in participants. Possible scores range from 0-63, with higher scores indicating greater prevalence of depressive symptomatology (0-9=normal, 10-18=moderately elevated, 19-29=moderate to severe depression, and 30-63=severe depression). Internal consistency (α) has been reported as 0.92 (Beck, Steer, & Brown, 1996) and this study found $\alpha = 0.87$. The BDI was also used because it includes factors that reveal negative attitudes towards the self (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961).

Stress levels were measured using the Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983), a ten-item measure that describes various examples of thoughts and feelings that participants may have experienced during

the past month. Internal consistency (α) for this measure has been reported to be 0.84 (Cohen, Kamarck, & Mermelstein, 1983), with this study finding an alpha of 0.88.

Body dissatisfaction, appearance, and attitudes. Eating attitudes were assessed using the Eating Attitudes Test (EAT-26; Garner, Olmsted, Bohr, & Garfinkel, 1982). This test is a 26-item measure of symptoms and concerns associated with eating disorders and it is often used as a screening tool to assess "eating disorder risk" in high school, college and other special risk samples (Garner et al., 1982). Possible scores range from 0-78, with a score of 20 or above indicating the presence of potentially detrimental eating habits. Reported internal reliabilities ranged between 0.86 and 0.90 (Garner et al., 1982) with the present study finding $\alpha = 0.82$.

Body dissatisfaction was measured using an adopted form of Stunkard's Figure Rating Scale (FRS; Stunkard, Sorenson, & Schulsinger, 1983). This measure consists of nine gender specific silhouettes, ranging from very thin to very obese. Participants are asked to select two figures; the silhouette that they feel best represents their own bodies, and the silhouette that they feel best represents their ideal body. Body dissatisfaction is then rated as the numbered difference between the ideal body image and the current body image. Criterion-related validity is assessed by comparing figure selection with BMI and has been reported as $r = 0.72, p < .05$ (Scagliusi et al., 2006). Correlations from this study between FRS figure selection and BMI were found to be $r = 0.74, p < .00$.

The Perceptions of Teasing Scale (POTS; Thompson, Cattarin, Fowler, & Fisher, 1995) was used to assess general

weight and competency criticism. The measure consists of 11 items describing forms of teasing that individuals may commonly experience, most of which focus on body size (e.g., *"People made jokes about you being too heavy"*). Participants rate the frequency for which they have experienced the forms of teasing on a scale from 1 (never) to 5 (very often). Participants reporting that they have experienced a form of teasing are asked to rate the degree to which it bothered them on a scale from 1 (not upset) to 5 (very upset). From the current study, this scale has demonstrated good internal consistency ($\alpha = 0.84$ for weight-related teasing and 0.79 for competency teasing, while this study found $\alpha = 0.86$ for weight-related teasing and $\alpha = 0.80$ for competency teasing) and has been validated against psychological measures related to teasing (Thompson, Cattarin, Fowler, & Fisher, 1995).

Participants' attitudes of their appearance were also assessed using the Physical Appearance Comparison Scale (PACS; Thompson, Fabian, Moulton, & Dunn, 1991), which is a five-item measure of the tendency to compare one's own appearance to that of other individuals. Scores on this scale range from 5-25, with higher scores suggesting greater tendencies to compare with others. Internal consistency has been reported between 0.78 and 0.80 (Thompson et al., 1991), with this study reporting 0.77 .

Body mass index (BMI) was also recorded and calculated using the formula defined by the Center for Disease Control (CDC) ($BMI = kg / m^2$) from students' height and weight measurements collected during the study (National Institute of Health [NIH], 1998).

Procedures

Participants arrived in a private clinic room, where they were given an

opportunity to provide consent before taking part in the experiment.

Participants were given an informed consent form, which had been approved by the University of Kansas institutional review board. The form utilized deception and indicated that the study was concerned with associations between measures of mood states on measures of body dissatisfaction, in order to mask the potential reactivity effects associated with the title of the experiment. The participants were informed that participation was voluntary, and that they were free to withdraw at any time without penalty. The conditional variable (knowledge of weight procedures) was not provided during the consenting process. Participants were also not informed about the specific purpose of the study until debriefing.

Participants were then given a battery of questionnaires to determine anxiety, stress, mood states, depressive symptoms, and eating attitudes, as well as how they viewed their body and how they compared themselves to others. The participants were randomly assigned to treatment conditions using a random number generator. Group one (control) received no information about weight prior to completing self-report measures of mood and body dissatisfaction. Group two (general cue) received general weight cues by being told that they were going to be weighed and have height recorded upon completion of the measures. The third group (specific cue) received specific weight cues by being weighed and measured before completing self-report measures (the weight was withheld to maintain consistency with the "general weight cue" group). The researcher utilized a script to maintain consistency when interacting with participants across groups. The

dependent variable of interest was body dissatisfaction, as defined by scores on the Figure Rating Scale. Height and weight information from all three groups was collected to control for BMI during analyses.

At the end of the experiment, participants were debriefed and given a debriefing form. In order to assess the degree in which participants became aware of the study's intentions, 20% of the participants were asked during debriefing if they could identify the true nature of the study. None were able to accurately identify the deception. Participants from the "specific weight cue" group were allowed to ask about their height and weight if they chose.

RESULTS

BMI

A univariate analysis of variance (ANOVA) was used to determine whether BMI was significantly related to the experimental condition (or independent variable). If the findings proved to be significant, then BMI would be included as a covariate with the rest of the analyses. If the findings were not significant, then BMI would not be used, as it would detract too much power from the rest of the analyses. There were no significant findings between BMI and the treatment conditions, $F(2, 75) = 1.30, p = 0.23$.

Current Body Image

Using the responses from the Stunkard Figure Rating Scale (FRS) as the dependent variable, a 2x3 ANOVA (Gender x Condition) was used to compare self-reported current body image, or what the participants denoted as the image that best represented their current body. There were significant differences between conditions in regards to current body image, $F(2, 75) = 4.58, p = 0.01, \eta^2 = 0.11$. Tukey post-hoc comparisons of the three groups indicate

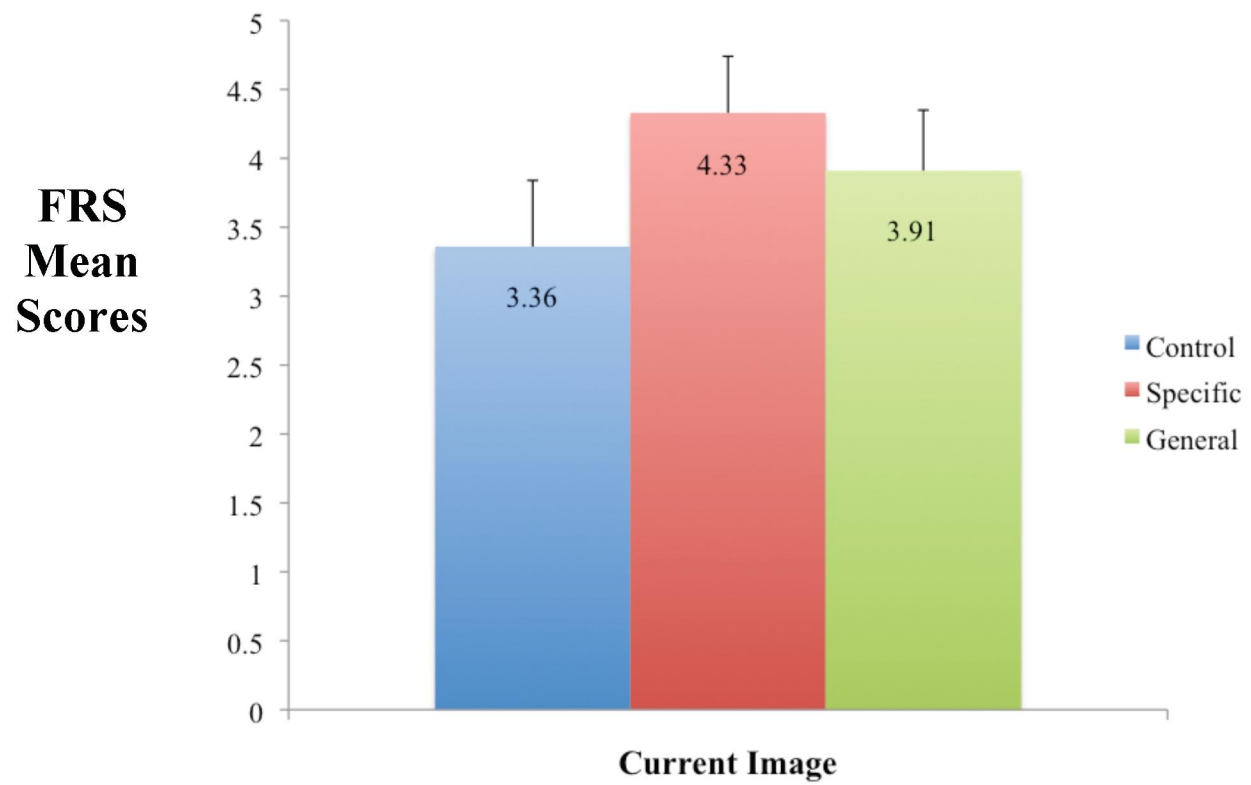
that, specifically, those in the specific weight cue condition ($M = 4.33, 95\% \text{ CI } [3.91, 4.74]$) selected from the FRS a figure that was significantly larger than those in the control condition ($M = 3.41, 95\% \text{ CI } [2.93, 3.89]$), $p = 0.005$.

Comparisons between the general weight cue group ($M = 3.91, 95\% \text{ CI } [3.47, 4.35]$) and the other two groups were not significant at $p < .05$. Females who received specific weight cues denoted no significant differences in body image ($M = 4.19, 95\% \text{ CI } [3.63-4.75]$) compared to females who received general weight cues ($M = 3.75, 95\% \text{ CI } [3.11-4.40]$) or no cues ($M = 3.72, 95\% \text{ CI } [3.05-4.40]$). Males had reported higher current body image when they received specific weight cues ($M = 4.46, 95\% \text{ CI } [3.84-5.08]$), when compared to those who received general weight cues ($M = 4.07, 95\% \text{ CI } [3.48-4.67]$) or no weight cues ($M = 3.00, 95\% \text{ CI } [2.33-3.67]$), although these findings were not significant at $p < .05$ (See Figure 1).

Body Dissatisfaction

A 2x3 ANOVA (Gender x Condition) was used to test the hypothesis that groups which received weight cues would report higher levels of body dissatisfaction than those who received no cues. The experimental condition main effect was the result of interest, along with the interaction between the experimental condition and gender. There were significant differences between conditions in regards to a main effect of body dissatisfaction, $F(2, 75) = 5.83, p = 0.005, \eta^2 = 0.14$, with no significant findings for a main effect of gender, $F(1, 76) = 0.19, p = 0.66, \eta^2 = 0.003$, or interaction between gender and condition, $F(2, 76) = 0.46, p = 0.64, \eta^2 = 0.01$. Tukey post-hoc comparisons of the three groups indicated that those in the specific weight cue condition ($M = 1.40$,

Figure 1. Current Body Image Scores Across Condition



95% CI [1.09, 1.71]) and general weight cue condition ($M = 1.08$, 95% CI [0.75, 1.41]) were significantly more dissatisfied with their body shape than those in the control condition ($M = 0.59$, 95% CI [0.24, 0.95]), $p < 0.01$ and $p < 0.048$ respectively (See Figure 2).

Body Image, Appearance, and Attitudes

The relationship between body image and BMI ratings was evaluated by examining correlations between current body image scores on the Stunkard's Figure Rating Scale (FRS) to participants' BMI. There was a positive correlation between BMI and FRS current image scores ($r = 0.73$, $p < .01$). These results support the validity of the FRS, illustrating that as a participant's BMI went up, the likelihood of that participant circling a larger body type increased. BMI also positively correlated with FRS body dissatisfaction scores, $r = 0.474$, $p < .01$, and weight-related teasing (POTSW), $r = 0.45$, $p < .01$.

Body-related measures also correlated to some of the mood state measures collected. Eating attitudes demonstrated correlations with anxiety (STAI), body dissatisfaction (FRS-BD), mood (POMS), and stress (PSS). Body dissatisfaction also correlated positively with depression (BDI). Lastly, physical comparisons of others correlated positively with anxiety (STAI), mood (POMS), and stress (PSS) (see Table 1).

DISCUSSION

As outlined above, the current study was an experimental investigation of the effects of reactivity by providing or withholding weight cues on self-report measures, specifically between male and female college-aged students. It was hypothesized that groups that received weight cues would report greater body dissatisfaction on self-report measures

than groups that received no cues, after controlling for BMI. The results supported this hypothesis by suggesting that weight cues elicited greater levels of body dissatisfaction between both male and female college-aged students. This strengthens the idea that reactivity effects influenced the resultant changes in body dissatisfaction. This study also demonstrated particular reactivity effects by revealing differences in current body image, as those in the specific weight cue condition selected a larger current body image on the Figure Rating Scale than those in the control and general weight conditions. These data appear to provide evidence suggesting that weight cue reactivity follows the same conditions as other, more extensively researched, cue-based reactivity (Tetley et al, 2009; Jansen, 1997; Carter et al., 1995), and fills a gap in the current weight-related literature.

Surprisingly, current body image scores increased significantly in the weight-cue conditions when compared to the control conditions. However, this increase was only demonstrated in the specific weight-cue group. This increase suggests that taking height and weight measurements before the study elicits strong reactivity effects which significantly alter the outcome of one measurement on a body dissatisfaction scale. A possible explanation for this is that some participants could have been primed by the weight procedure, which, given any already established positive or negative views about their body, might influence their internal representation of themselves and impact their self-perception of their body image, especially if that viewpoint is negative. Since this increase is not seen in the general weight cue condition, it is possible that just imagining the situation of being measured

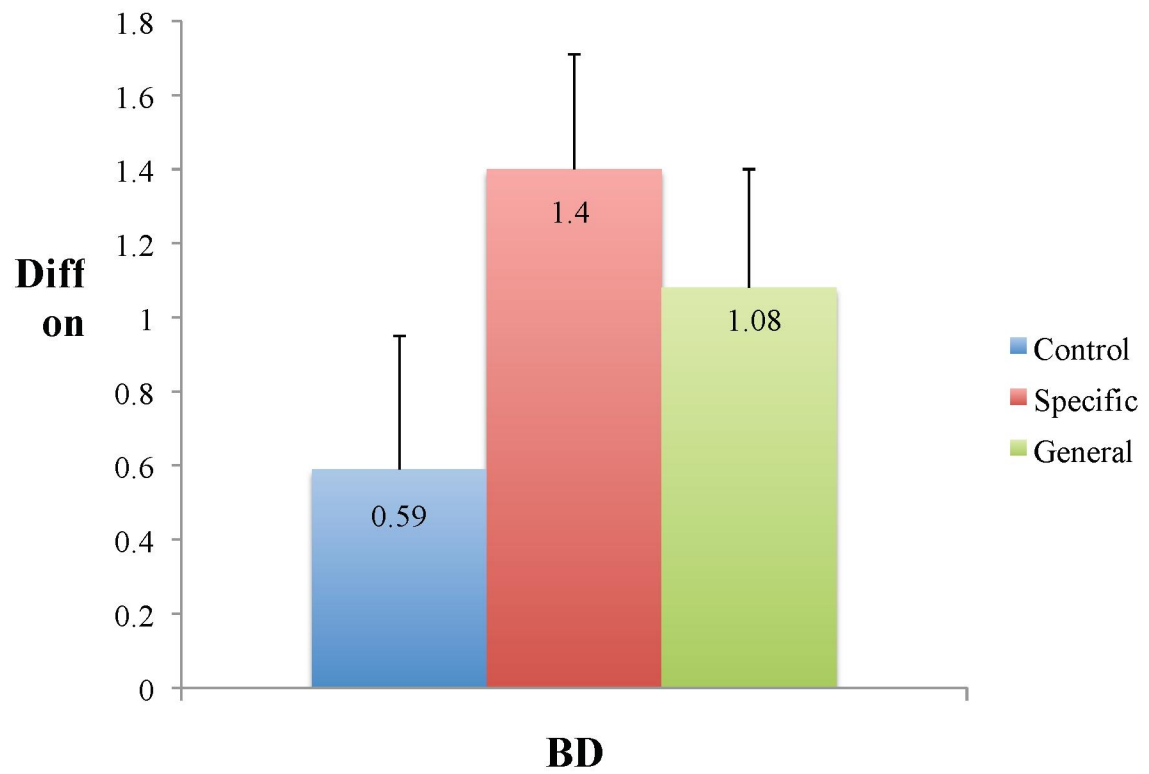
Table 1.*Summary of correlations between self-report measures and BMI*

Measures	BMI	EAT	BDI	STAI	FRS C	FRSB D	POM S	POTSW	PSS	PACS
BMI	--	-.061	.142	.017	.732 *	.474*	.058	.445	.086	-.069
EAT	-.061	--	.419*	.310 *	.001	.332*	.398*	.21	.336 *	.600*
BDI	.142	.419 *	--	.582 *	.04	.281**	.676*	.353*	.696 *	.624*
STAI	.017	.310 *	.582*	--	-.062	.065	.753*	.093	.723 *	.421*
FRSC	* .474	.001 .332	.04 .281*	-.062 *	-- .543	.543*	.068	.350*	.052	-.067 .262*
FRSBD	* .398	* .398	* .753	.065 *	* --	--	.246	.293**	.226 .750	* .494*
POMS	.058 .445	* .445	.676* .350	* .350	.068 *	.246 *	--	.221	* .241	.187
POTSW	* .336	.21 .336	.353* .723	.093 *	* .052	.293** .226	.221	--	.241 *	.568*
PSS	.086 .600	* .600	.696* .421	* *	.052 -.067	.226 .262**	.750* .494*	.241** .187	-- *	.568* --
PACS	-.069	* .624*	.624* *	* *	-.067	.262**	.494*	.187	* *	--

Note. BMI=Body Mass Index; EAT=Eating Attitudes Test; BDI=Beck Depression Inventory; STAI=State-Trait Anxiety Inventory; FRSC=Figure Rating Scale, Current; FRSBD=Figure Rating Scale, Body Dissatisfaction; POMS=Profile of Mood States; POTSW=Perceptions of Teasing, Weight-Related; PSS=Perceived Stress Scale; PACS=Physical Appearance Comparison Scale.

*p<.01, **p<.05

Figure 2. Body Dissatisfaction Across Condition



was not strong enough to elicit the same reactivity response, possibly because research has shown that participants generally have a poor time estimating their reactions to an imagined situation (Wilson, & LaFleur, 1995). The reactivity effect in the specific weight cue condition alone challenges the validity of the body dissatisfaction measure, consistent with previously outlined damage recorded in the literature (Heppner et al., 2008).

Our findings also indicated that both men and women experienced greater levels of body dissatisfaction in groups that received weight-cues, as opposed to those who did not receive any cues. There are conclusions regarding today's media that suggests women may be geared towards more dynamic self-perceptions of body image and perhaps may be more sensitive to self-conscious weight primes (Stice et al. 1994). However, women did not appear to experience any significant differences in levels of body dissatisfaction compared to men. Similarly, there were no significant differences between male and female current body images. This suggests that while those in weight conditions were influenced to be more aware of their internalized self-image and idealized image and were cued to feel greater discrepancies between the two, these effects were consistent between genders. These data support the current literature, which suggests that there are no differences between men and women in terms of overall levels of body dissatisfaction (Furnham et al., 2002; Silberstein et al, 1988).

The current study has several strengths. As there was a profound gap in the current literature, this appears to be the first study that empirically demonstrated significant reactivity effects

in self-report measures dealing with both current body image and body dissatisfaction. Height and weight were collected from each participant to analyze BMI for use in validating the Figure Rating Scale, as well as to allow for a possible control during data analysis. It is of interest to note that, although BMI was highly correlated with the Figure Rating Scale, there were no significant effects between BMI and condition, which allowed for the removal BMI as a covariate in these analyses. This change added to the overall power in our analyses. In addition, the use of a variety of other self-report measures, along with a cover story, allowed for effective deception. A fifth of the participants were asked if they could identify any deception or the overall goal of the study, and of these participants, none were able to correctly identify the goal of the study and all believed the deception presented.

Some limitations present in this study should be addressed in future research. The sample was drawn from a pool of midwestern university students, typically in their first year of college, so the generalizability of the findings to other geographical locations or age groups is unknown. The study was also conducted between February and May, and any potential seasonal effects that could influence body dissatisfaction were not accounted for and may have also influenced current body image. Order effects between self-report measures were partially addressed, with no two measures relating to body image or dissatisfaction being placed consecutively. However, it is unknown whether the order of administration of measures might have influenced body dissatisfaction responses or the duration of reactivity experienced, as it is shown

that at least physiological recordings can affect the outcomes calculated by these self-report questionnaires.

While this study has implications on informing researchers about the extent of weight cue reactivity effects, future research on reactivity and body dissatisfaction is needed to investigate several factors not addressed by this study. First, although BMI and the Figure Rating Scale were correlated, a study looking at clinician-rated body image in comparison with the FRS might help determine if the participants were being accurate in their ratings of their own body image, regardless of reactivity effects. The usefulness of the FRS needs to be investigated, as there does not appear to be any indication of BMI in relation to each figure, and it is unknown if the figures increase in BMI at consistent intervals. Replication of the current study, utilizing a larger sample and adding a pretest/posttest element of weight-cues and body dissatisfaction should be done in order to more thoroughly explore and understand the extent of the reactivity elicited by weight cues. Finally, although not a main goal of the current study, data was collected on mood states, eating attitudes and perceptions/comparisons of body among peers, as well as perceptions of teasing. Future research of weight cue reactivity on these measures might prove useful for self-report reactivity literature.

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